

Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Recycled Plastic Lumber (Ecomadera)

Revalora
Líderes en Economía Circular

From:

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Programme information

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Accountabilities for PCR, LCA and independent, third-party verification

Product Category Rules (PCR)

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

PCR 2019.14 Construction Products, version 1.3.4
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PCR review was conducted by: The Technical Committee of the International EPD® System.

See www.environdec.com for a list of members.

Review Chair: The most recent review chair: Claudia Peña, PINDA LCT SpA.
The review panel may be contacted via the Secretariat:
www.environdec.com/contact



Programme information

Life Cycle Assessment (LCA)

LCA accountability: Belén Rivera, Greenticket

Third-party verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

EPD verification by individual verifier

Third-party verifier: Javier Echazarreta | Instituto Nacional de Tecnología Industrial

Approved by: The International EPD® System

Procedure for follow-up of data during EPD validity involves third-party verifier:

Yes No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see ISO 14025.



Company information

Owner of the EPD

Revalora SpA

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Description of the organization

We are an organization committed to triple impact, focused on plastic waste recycling through a circular economy model. Through waste valorization, we are able to manufacture raw materials and products tailored to our customers' needs. This has allowed us to develop a wide range of solutions, including recycled plastic lumber, and urban, industrial, household, and inclusive furniture.

We are fully aware that the current model of production and resource management promotes short-term consumption, leading the planet toward an unsustainable future. That is why we work with dedication to bring low-carbon-footprint products to market, without compromising on functionality or performance when compared to conventional alternatives.

Revalora was founded in 2019 with a bold mission: to revolutionize plastic recycling in Chile and drive a true circular economy. Initially launched as a foundation focused on environmental education, it has evolved into a leading industrial company in sustainable innovation. With a state-of-the-art valorization plant located in the Valparaíso Region, Revalora is a key player in transforming plastic waste into high-value materials, with impact in the local market and the potential to reach international markets. Our R&D+I (Research, Development, and Innovation) division constantly seeks new technologies to enhance material properties and increase our capacity to process hard-to-recycle plastics.

Name and location of production site

Planta Revalora.

Parque industrial, Lote a28, Casablanca, Valparaíso Region, Chile



Product information

Revalora's Recycled Plastic Lumber (Ecomadera in Spanish) is an innovative material in the construction industry, developed from recycled plastics through an extrusion process. This material is an alternative to traditional wood, offering high durability, resistance to humidity and minimal maintenance needs.



It is important to mention that Recycled Plastic Lumber in its initial state is not a finished product, but a raw material that requires processing and transformation before being used in specific industrial applications such as Pallets, Decks and Sleepers.

Its competitive advantages are:

Durability and Resistance: It is extremely durable and resistant to environmental factors such as humidity, corrosion and insects, making it ideal for outdoor use.

Low Maintenance: Unlike traditional wood, recycled plastic decks do not require chemical treatments, sealants or periodic painting, which significantly reduces maintenance costs.

Stability and Consistency: Recycled Plastic Lumber does not warp, chip or crack over time, maintaining a consistent appearance and functionality.

Recyclability: At the end of their useful life, recycled plastic products can be recycled again, promoting a circular economy and reducing environmental impact.

Environmental Sustainability: Using recycled plastics reduces the amount of plastic waste in landfills and oceans, as well as decreasing the demand for wood, which helps conserve forests. It promotes a circular economy model by reusing discarded materials and turning them into useful products.

Reduction of GHG emissions: Manufacturing plastic lumber from recycled plastics consumes less energy than producing new plastics, reducing CO2 emissions. Plastic lumber has a longer lifespan than many traditional materials, reducing the need for frequent replacements and therefore the production of more materials.

UN CPC code 3695 Builders' ware of plastics nec

TABLE 1: TECHNICAL PROPERTIES

Specification	Method	LDPE	Unit	Value
Density	ASTM D6111-13a	Density	g/cm ³	0.89
Compression properties	ASTM D6108-13	Secant modulus of elasticity in compression	MPa	413.37
		Compression Strength	MPa	10.45
Flexural properties	ASTM D6109-13 method A	Secant modulus of elasticity	MPa	235.56
		tangent modulus of elasticity	MPa	81.13
		Flexural strength	MPa	3.23
	ASTM D6109-13 method B	secant modulus of elasticity	MPa	597.92
		tangent modulus of elasticity	MPa	452.99
		Flexural strength	MPa	6.92
Testing of mechanical fasteners	ASTM D6117-16 method A	Screw extraction resistance	kN	1.64
	ASTM D6117-16 method B	Screw Lateral Strength	kN	3.64
Thermal insulation-Determination of steady-state thermal resistance and related properties	NCh850.Of2008	thermal conductivity	W/m K	0.226
Charpy-V Impact	ASTM 6110-18	Impact resistance	kJ/m ²	5.1



LCA information

DECLARED UNIT:

1 kg of Recycled Plastic Lumber

TABLE 2: CONTENT DECLARATION

Raw material	Quantity (kg)	Post consumer recycled content (weight %)	Biogenic material (weight %)	Biogenic material (kg C/declared unit)
HDPE	0.28	58.47%	0.00%	0.00%
LDPE	0.51	4.34%	0.00%	0.00%
PP	0.21	0.00%	0.00%	0.00%
Hazardous substances	0.00	58.47%	0.00%	0.00%

Revalora has developed Recycled Plastic Lumber, ensuring it contains no substances that pose risks to human health or the environment. These include materials classified as carcinogenic (which can cause cancer), mutagenic (which can cause genetic alterations), toxic for reproduction (which can affect fertility or fetal development), or allergenic (which can trigger allergic reactions). Additionally, the company ensures that its products are free from substances harmful to ecosystems, such as those that are persistent, bioaccumulative, and toxic (PBT) or very persistent and very bioaccumulative (vPvB).

Revalora also guarantees that its Recycled Plastic Lumber is free from substances of very high concern (SVHC), in strict compliance with Regulation (EC) No 1907/2006 (REACH) and Regulation (EC) No 1272/2008, which governs the classification, labeling, and packaging of chemical substances within the European Union.

To maintain this level of safety and sustainability, Revalora exclusively partners with plastic suppliers that adhere to these regulations. These suppliers provide plastic waste of post-industrial or pre-consumer origin, ensuring that the materials have not been in contact with substances or products that could compromise their chemical integrity or safety.

Packaging

The packaging for the Recycled Plastic Lumber does not include recycled materials.

TABLE 3: PACKAGING CONTENT DECLARATION

Raw material	Weight (kg)	Weight (% versus the product)	Biogenic material (kg C/declared unit)
Film – primary packaging – LDPE	0.011	1.08 %	0.00

Time representativeness

From 2023-07-01 to 2024-06-30.

Geographical scope

Chile

Cut-off criteria

In stage A1, the extraction of raw materials and their processing to obtain plastics is excluded, because it corresponds to recycled waste, and in accordance with the Polluter Pays Principle the impact of their production is outside the scope of the study.

Waste generated during stage A3 due to the entry and separation of recycled raw materials, such as plastics incorrectly classified by suppliers, is not included in the study as it corresponds to less than 1% of the transported weight

Allocation

The Revalora plant produces other products besides Recycled Plastic Lumber, so with the intention of avoiding allocation, primary information was collected. In order to ensure traceability, the company has a detailed record of the amount of raw material processed, electricity and fuel consumption, and production for the different stages. Because of this, it was possible to isolate the specific consumption of LPG for the Recycled Plastic Lumber in 2024.

However, the same level of detail was not available regarding water consumption. As a result, total usage was calculated and allocated according to the quantity of product manufactured for the same period, using the following formulas:

$$\frac{\text{Recycled Plastic Lumber water consumption (L)} = \text{Total water consumption (L)} * \text{Recycled Plastic Lumber production (kg)}}{\text{Total production (kg)}}$$

In the case of LPG used in the forklift, for 2023 it was not possible to collect information separately by product category, so an allocation similar to that for water consumption was made. While for 2024, differentiated consumption was reported for Recycled Plastic Lumber.

$$\frac{\text{Recycled Plastic Lumber LPG consumption (kg)} = \text{Total LPG consumption (kg)} * \text{Recycled Plastic Lumber (kg)}}{\text{Total production (kg)}}$$

¹The Santiago Poniente sanitary landfill is the main disposal site in Santiago (<https://santiagorecicla.mma.gob.cl/wp-content/uploads/2019/04/Informe-Rellenos-Sanitarios-2017-VF.pdf>)

Scenarios

- The distance traveled during the collection of raw materials were estimated with the Google Maps and SeaRates tools.
- Since Recycled Plastic Lumber has not been recovered at present, it is assumed that 100% of the waste is sent to a landfill.

Assumptions

- For the transportation of waste (C2) generated at the end of life, a distance traveled of 30 kilometers was determined, estimated according to a central point in Santiago and the Santiago Poniente Sanitary Landfill.
- It is assumed that there are no material losses during the processing stage and that all plastic entering the plant is used.
- For those transports of recycled plastics where it was not possible to identify the point of origin, and therefore, the distance traveled, a value of 95 km was assigned, corresponding to the average distance of the other transports.

Exclusions

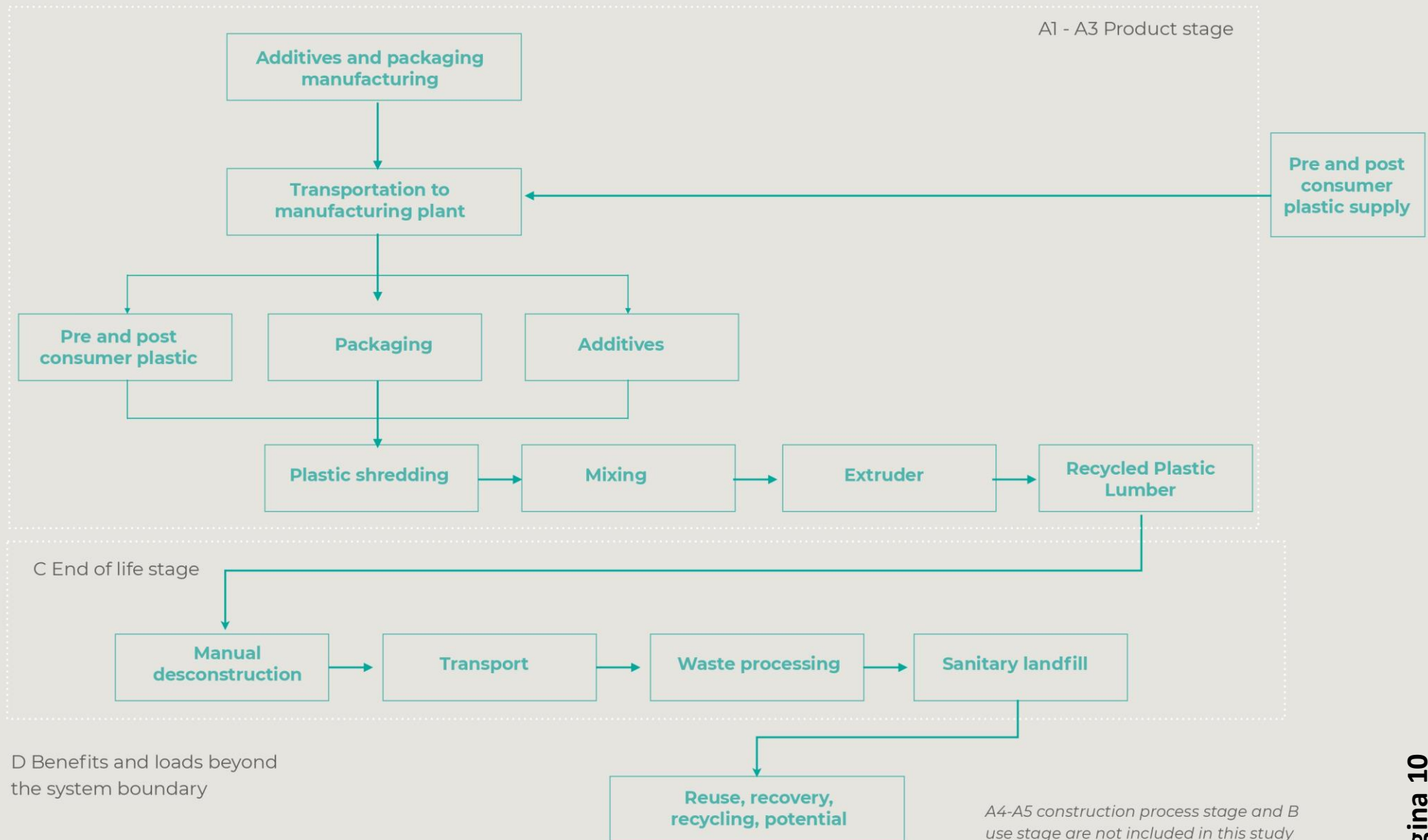
- Labor is not considered in any of the stages analyzed. In addition, they do not have a relevant contribution to the environmental performance of the product.
- Impacts associated with infrastructure are excluded, as well as the manufacturing of machinery and equipment used in the product life cycle.
- Emissions from administrative activities, business travel, stationery and lighting are not included.

Database(s) and LCA software used

Ecoinvent v3.10, SimaPro 9.6.0.1

Description of system boundaries

Cradle to gate with modules C1-C4 and module D (A1-A3 + C + D)





Process	Description
A1 Raw material supply	<p>Includes emissions generated by the extraction of raw materials needed to produce the additives, pigments and desiccants used, in addition to the primary packaging of the product.</p> <p>The extraction and processing of raw materials for plastic is not considered because it is recycled.</p>
A2 Transport	Includes emissions from land transport of raw materials (recycled plastics), packaging and other inputs to the production plant.
A3 Manufacturing	This includes emissions generated from the processing of raw materials to obtain the final product. It covers energy and water consumption, and the use of fossil fuels, and the stages shredding, mixing and extrusion.
C1 Deconstruction	It does not include emissions, since this process is carried out manually, therefore, there is no energy consumption. Waste is generated that corresponds to steel screws and plastic, corresponding to Recycled Plastic Lumber.
C2 Transport	Includes emissions generated from the transportation of waste to final disposal.
C3 Waste processing	100% of the waste is sent to a landfill.
C4 Disposal	Includes emissions generated from the treatment of waste in landfills.
D Reuse, recovery, recycling, potential	Since all waste generated in module C is sent to a landfill, there is no potential for recycling or recovery.



Declared modules

For the Life Cycle Analysis of the Ecomadera, a cradle to gate scope with options was considered, covering modules A1 - A3 + C + D. Not included within the study are the stages of transportation (A4); installation (A5); material emissions per use (B1); repair (B3); replacement (B4); rehabilitation (B5), operational energy use (B6) and operational water use (B7).

	Product stage			Construction process stage		Use stage							End of life stage			Resource recovery stage	
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	CL	CL	CL	ND	ND	ND	ND	ND	ND	ND	ND	ND	CL	CL	CL	CL	CL
Share of specific data	84%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%					-	-	-	-	-	-	-	-	-	-	-	-

²In accordance with the PCR, specific data is considered to complete the table as information collected in the actual manufacturing plant where the specific processes of the product are carried out, real data from other parts of the life cycle related to the product and transport data that consider the distance and means of transport of the contracted suppliers. For this LCA, specific data from the manufacturing of the inputs is not considered, since it was not possible to collect information from the suppliers.



Electricity mix

Revalora uses electricity from renewable sources, generated 100% by ground-mounted photovoltaic system, see Annex A.

Energy source	Technology	Emission factor for GWP-GHG (kg CO ₂ /kWh)
Solar	Ground-mounted photovoltaic system	0.00472



Results of the environmental performance indicators

The following potential environmental impacts, use of resources and waste categories have been calculated using SimaPro (v9.6.0.1). The EN 15804 reference package based on EF 3.1 was used.

The results are presented for the declared unit: 1 kg of recycled plastic lumber in its corresponding packaging.

Impact category indicators per declared

INDICATOR	UNIT	A1 – A3	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq	3.05E-01	0.00E+00	4.19E-02	0.00E+00	6.25E-03	0.00E+00
GWP-biogenic	kg CO ₂ eq	1.14E-04	0.00E+00	2.89E-06	0.00E+00	1.53E-06	0.00E+00
GWP-luluc	kg CO ₂ eq	1.71E-04	0.00E+00	4.13E-06	0.00E+00	3.22E-06	0.00E+00
GWP-total	kg CO₂eq	3.05E-01	0.00E+00	4.19E-02	0.00E+00	6.26E-03	0.00E+00
ODP	kg CFC 11 eq	7.18E-09	0.00E+00	6.45E-10	0.00E+00	1.81E-10	0.00E+00
AP	mol H ⁺ eq	2.21E-03	0.00E+00	2.21E-04	0.00E+00	4.43E-05	0.00E+00
EP-freshwater	kg P eq	7.00E-05	0.00E+00	7.84E-07	0.00E+00	5.19E-07	0.00E+00
EP-marine	kg N eq	5.19E-04	0.00E+00	9.58E-05	0.00E+00	1.69E-05	0.00E+00
EP-terrestrial	mol N eq	5.54E-03	0.00E+00	1.05E-03	0.00E+00	1.84E-04	0.00E+00
POCP	kg NMVOC	2.01E-03	0.00E+00	4.18E-04	0.00E+00	6.60E-05	0.00E+00
ADP-minerals&metals*	kg Sb eq	2.22E-06	0.00E+00	2.72E-08	0.00E+00	9.77E-09	0.00E+00
ADP-fossil*	MJ, net calorific value	5.73E+00	0.00E+00	5.43E-01	0.00E+00	1.53E-01	0.00E+00
WDP*	m ³	8.54E-02	0.00E+00	8.69E-04	0.00E+00	6.71E-03	0.00E+00

Acronyms

GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

* Disclaimer

The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

The use of the results of modules A1-A3 without considering the results of module C is discouraged.

Additional mandatory and voluntary impact category indicators per declared unit

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP-GHG	kg CO ₂ eq.	3.05E-01	0.00E+00	4.19E-02	0.00E+00	6.26E-03	0.00E+00

Resource use indicators per declared unit

Category	Unit	A1 – A3	C1	C2	C3	C4	D	
Primary energy resources – Renewable	Use as energy carrier (PERE)	MJ, net calorific value	9.16E-01	0.00E+00	2.27E-03	0.00E+00	0.00E+00	0.00E+00
	Used as raw materials (PERM)	MJ, net calorific value	1.52E-01	0.00E+00	0.00E+00	0.00E+00	1.37E-03	0.00E+00
	TOTAL	MJ, net calorific value	1.07E+00	0.00E+00	2.27E-03	0.00E+00	1.37E-03	0.00E+00
Primary energy resources – Non-renewable	Use as energy carrier (PENRE)	MJ, net calorific value	6.91E-01	0.00E+00	5.43E-01	0.00E+00	0.00E+00	0.00E+00
	Used as raw materials (PENRM)	MJ, net calorific value	5.04E+00	0.00E+00	0.00E+00	0.00E+00	1.53E-01	0.00E+00
	TOTAL	MJ, net calorific value	5.73E+00	0.00E+00	5.43E-01	0.00E+00	1.53E-01	0.00E+00
Use of secondary materials (SM)	kg	1.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels (NRSF)	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels (NRSF)	MJ, net calorific value	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water (FW)	m ³	5.10E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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Waste indicators

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste disposed	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Radioactive waste disposed	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Output flow indicators

Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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